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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/817,530

04/02/2004

Werner Braun

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26813

7590

11/29/2007

MUETING, RAASCH & GEBHARDT, P.A.

P.O. BOX 581415

MINNEAPOLIS, MN 55458

EXAMINER

CLOW, LORI A

ART UNIT

PAPER NUMBER

1631

MAIL DATE

DELIVERY MODE

11/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/817,530

Applicant(s)

BRAUN ET AL.

Examiner

Lori A. Clow, Ph.D.

Art Unit

1631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/7/07; 4/20/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicants' response, filed 11 September 2007, has been fully considered. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

Claims 1-3 and 5-22 are currently pending. Claim 4 has been cancelled.

Information Disclosure Statement

The Information Disclosure Statement filed 7 June 2007 has been considered in full. A signed copy of PTO Form 1449 is included with this Office Action.

CRF

The CRF submitted 7 June 2007 has been entered.

Specification

The use of the trademark BLAST, among other trademarks noted, is present in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology. It is noted that Applicant must correct ALL trademarks appearing in the specification. This is just an example.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Applicant has argued that they believe that BLAST is an acronym for basic local alignment search tool. While this is true, BLAST is also a trademark. The wordmark BLAST was filed on 20 September 1999 as serial number 75804279 and was published as Registration number 2423050 on 23 January 2001. BLAST is owned by the National Library of Medicine and is currently a live trademark. Correction is requested.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-3 and 5-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter, for the reasons set forth in the previous Office Action and re-iterated below. The additions to the rejection are necessitated by claim amendment.

Claims 1-3 and 5-22 are directed to a method and computer program for use in sequence data analysis comprising various method steps, such as, providing physical-chemical property (PCP) descriptors, describing sequence alignments in terms of eigenvector, analyzing PCP alignments, defining PCP motifs, and using the motifs to search a sequence database resulting in the identification of one or more related sequences. The method steps in the instant claims fall into a category of judicial exception, as they merely recite manipulations of data (abstract ideas/algorithms) and do not recite either a physical transformation of matter nor a practical application [i.e. concrete, tangible, and useful result], as required under 35 USC 101 for a judicial exception to become statutory. Where a claimed method does not result in a physical

transformation of matter, it may be statutory where it recites a concrete, tangible, and useful result (i.e. a practical application). The steps of providing physical-chemical property (PCP) descriptors, describing sequence alignments in terms of eigenvectors, analyzing PCP alignments, defining PCP motifs, and searching a sequence database are not deemed a “useful, concrete, and tangible result.” Therefore, no actual, concrete result is recited in the claims, nor is any useful result “produced” in a tangible form useful to one skilled in the art. For these reasons, the claims are not statutory.

This rejection could be overcome by amending the claims to recite that a result of the method is “displayed” or “outputted” (e.g. output to a user, a display, a memory, or another computer, etc.), or by amending the claims to include a step of a physical transformation of matter (e.g. assay), if such is supported in the specification as originally filed. For an updated discussion of statutory considerations with regard to non-functional descriptive material and computer-related inventions, see the Guidelines for Patent Eligible Subject Matter in the MPEP 2106, Section IV.

Response to Applicant’s Arguments

1. Applicant argues that an actual concrete result was recited in the claims because there is a definition of one or more PCP motifs in the multiple sequence alignment.

This is not persuasive. While the definition of one or more PCP motifs may be concrete, it is not a tangible result, such as in the form accessible by a user or output to a user, such that it is useful. Therefore, the claim remains non-statutory.

2. Applicant argues that “a first output of the method and/or program are defined PCP motifs”. While this may be an intended result of the method, this is not recited in the claim and thus this limitation is not part of the instant claim. Defining a PCP motif could be done within the confines of the computer and never be accessible to a user in the form of a tangible result. Without such a recitation in the claims, provided there is sufficient support in the specification as originally filed, the claim is non-statutory.

3. Applicant argues that the addition of “resulting” in the claim overcomes the rejection of record. This is not persuasive for the reason set forth above.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3 and 5-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This is a new grounds of rejection necessitated by claim amendment.

Claims 1 and 12 have been amended to recite, “using the one or more PCP motifs to search a sequence database resulting in identification of one or more related sequence segments having PCP characteristics similar to one or more of the PCP motifs”. It is unclear in the recitation of “one or more of the PCP motifs”, as to what PCP motifs Applicant intends. Does Applicant intend that the claim read “one or more of the defined PCP motifs” or are the PCP motifs coming from somewhere else? Clarification is requested.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3 and 5-22 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatarajan et al. (J. Mol. Model (2001) Vol. 7, pages 445-453; PTO Form 1449 reference) in

further in view of Zhu et al. (Bioinformatics (2000) Vol. 16, pages 950-951; PTO Form 1449 reference).

The instant claims are drawn to a method and computer program for sequence data analysis comprising providing a multiple sequence alignment comprising a column, providing PCP (physical-chemical property) descriptors corresponding to eigenvectors, describing each amino acid in terms of the PCPs, analyzing the PCP alignments to yield conservation property data, and analyzing the conservation property. The claims are further drawn to entropy values with predetermined limit, using PCP motifs to search a database for related sequence segments, using positional scoring to generate matrices, and ranking proteins.

Venkatarajan et al. teach a method for deriving new quantitative descriptors for the 20 naturally occurring amino acids based upon multi-dimensional scaling of 237 physical-chemical properties (page 445, abstract). Venkatarajan further teaches that the descriptors provide a quantitative means to identify property motifs in sequences of protein families. A property of an amino acid is normalized such that the standard deviation is 0 (page 446, column 1). Each amino acid is represented by an eigenvector which has an associated eigenvalue (page 446, column 1). Once the vectors are calculated, a property distance matrix is established (page 446, column 2). Similarity matrices are developed based upon structural similarity (page 450, column 2).

Venkatarajan does not teach the multiple sequence alignment whereby a column of aligned amino acids and/or gaps is represented or using a sequence motif to search a database, or defining a PCP motif as a series of matrices. However, Zhu et al. teach a software tool for pattern recognition in multiple aligned protein sequences called MASIA (page 950, abstract). MASIA converts a sequence to a properties matrix that can be scanned in both the vertical and

horizontal steps. Patterns are recognized based upon statistical significance of their occurrence (abstract). Further specifics include the conversion of sequence alignment matrix to a property matrix, in which motifs are identified. The matrix of properties is scanned in vertical and horizontal steps to search for combinations of conserved properties (page 950, column 2). The three major components of the program are the property library, statistical evaluation for determining property conservation and the command-line macro (page 950, column 2). The methods are based upon probability entropy to show significant conservation in a column (page 950, column 2).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to have used the PCP descriptors of Venkatarajan with the alignment methods of Zhu in sequence data analysis because all the claimed elements were known, in the prior art, as shown above. Further, one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention.

Venkatarajan and Zhu do not specifically teach Bayesian ranking, as in claim 8 and 19. However, it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to have employed Bayesian scoring, as an alternative to similarity scoring, as it is well-known in the art the Bayesian analysis is used to evaluate distributions in scores.

Response to Applicant's Arguments

1. Applicant argues that Venkatarajan does not teach each element of claim 1 (and lists those elements separately).

This is not persuasive. As pointed out in the rejection above, Venkatarajan in combination with Zhu do teach each element of the claimed invention and it would have been obvious to combine the references, as presented above.

No claims are allowed.

Conclusion

It is noted that the Declaration filed under 37 CFR 1.132 is sufficient to remove the Mathura reference, previously relied upon to support a case of obviousness. Applicant stated that the reference was improperly applied. However, the Examiner does not agree. The reference, "by others" was published before the filing date of the instant application and therefore was a proper reference. However, in light of the Declaration the reference has been withdrawn.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Inquiries

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR § 1.6(d)). The Central Fax Center Number is (571) 273-8300.

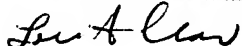
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lori A. Clow, Ph.D., whose telephone number is (571) 272-0715. The examiner can normally be reached on Monday-Friday from 10 am to 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on (571) 272-0720.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

LORI A. CLOW, PH.D.
PRIMARY EXAMINER



November 21, 2007
Art Unit 1631